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ABSTRACT

A survey of 98 Papua New Guinea technical university graduates in the applied sciences, engineering fields, and forestry investigated their language skill use and language needs in the workplace. Results indicate that, as in Papua New Guinea society in general, English and Tok Pisin are the two most important languages for technical communication in the workplace. Common language use patterns for technical purposes include Tok Pisin used alone, mixed with English, "simplified" English, and formal, technical English. Practical, appropriate syllabuses, materials, and methods for teaching languages for special purposes (LSP) should be developed to accommodate these existing language use patterns. This could be handled by offering courses in language for occupational purposes and language for academic purposes. It would also be desirable to introduce technical language in the student's dominant language, which in this context is often Tok Pisin, for purposes of concept development, then translate the terms into English. The data also suggest a need to review the assumption that formal rather than local varieties of English should be taught in Papua New Guinea higher education. (Contains 38 references.) (MSE)

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AN ASSESSMENT OF LANGUAGE NEEDS FOR TECHNICAL COMMUNICATION IN A MULTILINGUAL SPEECH COMMUNITY: IMPLICATIONS FOR TEACHING LSP IN PAPUA NEW GUINEA

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AN ASSESSMENT OF LANGUAGE NEEDS FOR TECHNICAL COMMUNICATION IN A MULTILINGUAL SPEECH COMMUNITY: IMPLICATIONS FOR TEACHING LSP IN PAPUA NEW GUINEA

The Language Ecology of Papua New Guinea

That Papua New Guinea is one of the world's most diverse multilingual speech communities is a commonplace in sociolinguistic scholarship. In a population of just over three and a half million (National Statistical Office, 1991: 3), there are, it has been claimed, 717 distinct languages spoken as a mother tongue (or *Tok Ples*), only 366 of which have more than 1,000 speakers each (Johnson, 1979: 136). Under such conditions a number of pidgin languages have arisen as *lingue franche* "in response to social situations requiring intercommunication across several language boundaries" (Wurm, 1979: 5-6). The two most common of these languages are Tok Pisin (also known as Neo-melanesian and New Guinea Pidgin), originally developed in the northern part of the nation, and Hiri Motu, limited to the south and now losing ground to Tok Pisin (see e.g., Laycock, 1979: 82 ff and Kale, 1989). As a former British (and later Australian) colony, PNG has also used English as an additional language for national communication, and until very recently English has been the sole official language for all formal education. In the 1970s it was estimated that nearly one-half the population of PNG spoke Tok Pisin, about ten percent spoke Hiri Motu, and just over one-fifth spoke English (Laycock, 1979: 84). In the 1990s the figures for both Tok Pisin and English have almost certainly increased, due to social mobility, expansion of the mass media and developments in literacy and education. In fact, in urban centres Tok Pisin has become a first language (or Creole) for some speakers (Muhlhausler, 1982 and Smith, 1990).

The ways Tok Ples, *lingue franche* and English are used for communication and how they interact, define the *language ecology* (Enniger and Haynes, eds. 1984) of PNG as a speech community. Multilingual individuals in this community share a *communicative repertoire*: a speaker commands not only the linguistic forms of particular languages but also has the ability to draw upon them in specific situations: for instance to choose to use one language rather than another or to mix them together, according to tacitly understood conventions. It has been claimed that such multilinguals may have a *compartmentalized* repertoire (Gumperz, 1968: 385 f). This means that they agree to assign each language to a set of predetermined communicative purposes. Language functions in this formulation according to a system of *diglossia* (Fishman, 1967)-- expanded to *triglossia* by Mkilifi (1972)-- whereby each language operates as a code for use in its own particular *domain*. For instance, in Papua New Guinea English has been considered as a *High* code (the language of education, science, and technology, Tok Ples as a *Low* code (for inter-fami-

ly, personal, or "traditional" communication) and a pidgin language as a *Medium* code (for, e.g., conducting local trade, commerce and interpersonal urban relationships). The underlying principle of the *-glossia* concept is that there is a stable relationship between each language and its assigned domains. Thus, if we know the domain, we shall be able accurately to predict the language that will be conventionally selected as appropriate to that domain.

However, this explanation of multilingual ecology does not apply to all speech communities. Sometimes communication occurs in which the choice of language cannot be accurately predicted from the domain in which it is used. This is because there is no tacit assignment of particular codes to particular functions. In these circumstances, Gumperz has proposed that a *fluid* language repertoire is operating. This formulation helps to explain why in PNG, for instance, people may talk about science in Tok Pisin even when both participants in a conversation are able to use English and even when their previous discourse about science (in a classroom, say) has been in English. A fluid repertoire would account for *code mixing*, which is obvious to anyone walking along the streets of towns and cities in the nation. Muhlhausler (1979: 170 f) has given some examples of code mixing between English and Tok Pisin in the conversation of PNG University students. Within the same domain and even the same exchange, more than one language may be used. This practice has been said to mark an *unstable diglossia* and is attributed to a high degree of social mobility, especially in rapidly growing urban areas (Bickerton, 1975: 24). Just as old social structures break up, so does stable diglossia. In the last 20 years or so in PNG, Tok Pisin has gradually expanded into many domains of modern life, such as technology, which were formerly reserved to English; in fact the functional range of English has decreased while that of Tok Pisin has expanded (Muhlhausler, 1979: 172-3). In these circumstances, the assignment of language to function is unlikely to be stable.

It is easier to design an educational curriculum for a multilingual community with stable diglossia than it is for one in which diglossia is unstable. As long as English is the code for academic, technical and professional communication, then it is clear that English language syllabuses, materials and methodologies should be developed with these ends in view. But when, for socioeconomic reasons, languages which have been considered *Low* or *Medium* codes begin to perform functions hitherto reserved for a *High* code (using Tok Pisin to talk about technology, say), then educationalists face a dilemma. Under stable diglossia students can be taught how to communicate for specific purposes in a single language, the language which is assigned to the relevant domain. But with unstable diglossia it may be difficult, in an orthodox curriculum, to accommodate language *and* communication in the same class. Acquiring skills for successful communication for specific purposes in such a speech community involves developing students' strategies in a number of different languages concurrently. And this, in turn, means a basic reconsidera-

tion of the nature of a "language class". To teach *a (single) language* in the sociolinguistic context of multilingualism with unstable diglossia is inconsistent with teaching *communication*.

Communicative Language Teaching for Technology in Papua New Guinea: ESP or LSP?

As in most parts of the English-speaking world, communicative language teaching in Papua New Guinea has traditionally been conducted through English. To its credit, the educational system here was one of the first to adopt a communicative/functional approach to ELT in secondary schools (Johnson, 1977b: 820; Cane, 1983; Eaton, 1982), and ESP has long been the basis of language instruction in tertiary institutions such as the University of Technology (Smithies, 1981; Robinson, 1985). At Unitech, the Department of Language and Communication Studies currently provides all students with ESP "service" courses to equip them to pursue their academic work and to acquaint them with the types of English used in the various professions they will enter. In one sense the principle of language teaching for practical communication flourishes in Papua New Guinea, and most English teachers see themselves as providing instruction in the use of this language as a response to and a creation of particular contexts.

On the other hand, when communicative practice in the nation is considered in light of its language ecology, then one begins to doubt just how "communicative" language teaching is if it concentrates mainly on English. There is a certain irony in an exclusive ESP policy for multilingual communities which is based upon the tenets of a communicative approach. For instance, Kennedy and Bolitho (1984: 11-12) clearly state at the beginning of their useful book on ESP, that a teaching programme should reflect the real language context, including the complementary role English plays *vis-a-vis* other languages. They then proceed to devote the rest of their discussion to strategies for the teaching of English only. Closer to home, Selinker (1988: 33) encourages English teachers in Southeast Asia not to restrict themselves to English-based concerns but to be open to a broader-based *language* for specific purposes. But these comments are confined to a footnote at the beginning of an article otherwise concerned with entirely ESP scholarship and methodology. When we turn to consider the emphasis of the leading journal in the field, *English for Specific Purposes*, a perusal of the issues from 1989 to 1992 reveals that very few articles directly confront the issue of the use of English alongside other languages in multilingual communities. Even when these languages are considered, the typical attitude adopted is similar to, for example, that of Bensoussan (1990), whose article concentrates upon the negative "interference" of discourse forms in a first language on the acquisition of English schemata.

It would appear, then, that in published scholarship LSP has, in spite of the lip service often paid to it, been overshad-

owed by research into and discussions of ESP. Perhaps this is to be expected in a world where, according to the *Economist* the teaching of English is worth six billion pounds a year globally and is estimated to be Britain's sixth largest source of invisible earnings (reference in Bryson, 1991: 177). Political and economic realities tend to obscure the logical point that Kennedy and Bolitho and Selinker imply: that if ESP teaching is to facilitate communication in multilingual speech communities, then it must be undertaken within the larger context of teaching other languages, as part of an LSP programme. Successful teachers working within the language ecology of Papua New Guinea are aware of the fact that -- regardless of official policy-- languages other than English *are* used for both academic and occupational purposes even by highly trained professionals. Previous research has shown that University students in PNG use Tok Pisin in their academic work, both for studying (Swan and Lewis, 1990: 224) and in class (Johnson, 1977b: 455). Swan and Lewis (1990: 213) also claim that as many as 75% of University of Technology graduates use Tok Pisin to some extent in their jobs.

Nevertheless, there has been no concerted effort to deal with the implications of an LSP (as opposed to ESP) approach to tertiary language education in Papua New Guinea. The present paper is an attempt to offer empirical evidence regarding what actually happens when University of Technology graduates communicate in the work place in PNG. It also provides information about the attitudes of these graduates to their own communicative behaviour and that of fellow workers. It is hoped that the data will help to provide a foundation for LSP planning. This study complements the earlier research by Swan (1986) and takes up his recommendation to investigate the precise areas of work in which graduates use Tok Pisin and the extent of such use (p. 15). Swan was concerned with the attitudes of employers to graduates' communicative abilities as well as the attitudes of the graduates/employees themselves. The present project is exclusively from the employees' point of view. Swan concentrates mainly on implications for improved ESP teaching at Unitech, but he also recommends, on the basis of his findings, that appropriate courses be designed to assist students extend and refine their use of Tok Pisin in professional areas. As will be shown, the evidence collected in 1993 indicates that this need is even more pressing now than it was in 1986.

Assessment of Language Needs in the Work Place: Responses to the Questionnaire

In December 1992 a questionnaire concerning language use was mailed to a total of 287 University Technology graduates employed in Papua New Guinea. Since no centralized records of graduates' addresses were available, information was supplied on an *ad hoc* basis by individual academic departments. These included Applied Sciences, Civil Engineering, Electrical and Communications Engineering, Forestry, Mechanical Engineering and Mining Engineering.

It was not possible to contact all graduates, only those who had kept in touch with their departments. Of the questionnaires mailed out, a total of 98 responses were received. Seventeen of the original 287 were returned unopened.

The questionnaire and the results obtained follow. The tabulation of the responses to each question is printed in italics immediately following it. Since the total number of responses is close to 100, percentages are not specified.

QUESTIONNAIRE ON LANGUAGE USED IN THE WORK PLACE

(Note: Do not give your name unless you want to.)

PART I: PERSONAL INFORMATION

1. Where are you employed (name and address of company)?

Location:

National Capital District (Port Moresby) -	*50*
Lae and Morobe Province -	*23*
Madang and Madang Province -	*5*
Mt. Hagen, Western Highlands Province -	*5*
Western Province (Daru and Tabubil) -	*4*
Eastern Highlands Province (Goroka and Kainantu) -	*2*
Rabaul, East New Britain Province -	*1*
Porgera, Enga Province -	*1*
Mendi, Southern Highlands Province -	*1*
Popondetta, Oro Province -	*1*
Bialla, West New Britain Province -	*1*
Wewak, East Sepik Province -	*1*
Addresses not given -	*3*

Major employers:

Post and Telecommunication Corporation -	*31*
Private Engineering/Construction Companies -	*9*
Electricity Commission -	*8*
Forestry Research Institute -	*6*
Department of Works -	*5*
Porgera Joint Venture -	*5*
Ramu Sugar Ltd. -	*4*
National Forest Service -	*4*
Development Agencies -	*4*
Department of Forests -	*3*
Ok Tedi Ltd. -	*3*
Harbours Board -	*3*
Defense Force -	*2*

Bureau of Water Resources - 2
Shell PNG Ltd. - 2
SP Brewery - 2

2. What position do you hold?

Engineer - 35
Manager (Director, Executive Officer, etc.) - 30
Technical Officer - 7
Research Officer - 5
Metallurgist - 4
Planning Officer - 3
Draftsman - 2
Training Officer - 2
Unspecified - 10

3. Please give a brief description of your duties.

Analysis, testing, evaluation - 24
Planning - 21
Implementation, operations, production - 20
Design - 18
Coordination, liaison - 17
Maintenance - 15
Training - 8
Research and Development - 7
(Note: Many respondents included more than one type of duty.)

4. What year did you graduate from University?

1972 - 1	*1979 - 5*	*1986 - 5*
1973 - 1	*1980 - 7*	*1987 - 9*
1974 - 0	*1981 - 2*	*1988 - 8*
1975 - 1	*1982 - 8*	*1989 - 5*
1976 - 6	*1983 - 5*	*1990 - 12*
1977 - 1	*1984 - 7*	*1991 - 2*
1978 - 7	*1985 - 4*	*not given - 2*

PART II: YOUR LANGUAGE USE IN GENERAL

5. List the languages you speak.

English - 98
Tok Pisin - 91
Hiri Motu - 22
Tok Ples (unspecified) - 28

A total of 37 different indigenous Papua New Guinean languages were specified as Tok Ples. Those mentioned more than once

are:
Enga - 6
Kuman - 3
Hula - 2
Kuanua - 2
Roro - 2
Toaripi - 2

One foreign language was mentioned:
Japanese - 2

6. Indicate below (by placing a tick in the appropriate box) how often you use each of the following languages at your work place.

	Often	Sometimes	Rarely	Never
English	94	3		
Tok Pisin	37	54	6	
Hiri Motu	2	9	12	49
Tok Ples (specify)	7	12	25	42
Others (specify)				

7. Which language do you use most often in speaking at your work place?

English - 61
Tok Pisin - 10
English and Tok Pisin - 23
English, Tok Pisin and Hiri Motu - 2
Tok Pisin and Tok Ples - 1
Not answered - 1

8. Which language do you use most often for reading and writing at your work place?

English - 96
English and Tok Pisin - 1
English, Tok Pisin and Hiri Motu - 1

9. If you knew another language, do you think that you could work more efficiently than you do now?

No - 79
Yes - 15
Uncertain - 4

10. If your answer to question 9 is "YES", then which additional language do you think would help you most in your work?

Tok Pisin - 9
Hiri Motu - 5
Japanese - 2
German - 2

11. (A) Do you write in any language other than English in the course of your work?

No - 75
Yes - 20
Not answered - 3

(B) If your answer to the previous question is "YES", then what other language(s) do you use for writing?

Tok Pisin - 21
Hiri Motu - 2
Misima - 1

(C) What kind of writing do you do in this language/these languages (for example, memos, letters, notices, notes)?

Notices - 15
Letters - 14
Memos - 11
Notes - 5
Instructions - 2

12. Do you have any problems communicating with other people in your work place?

No - 75
Yes - 22
Not answered - 1

13. If your answer to the previous question is "YES", then are these problems due to your lack of knowledge of a language or to some other reason?

Lack of knowledge of a language (general) - 8
Lack of knowledge of the Tok Ples of labourers - 3
Lack of technical English - 4

Lack of "fluent" English - 3
Lack of ability to explain at appropriate level - 2
Ignorance and pride of contract officers - 1
Shyness - 1
Other reason unspecified - 3

14. If you are responsible for training other staff (either formally or informally) at your work place, which language(s) do you use for this purpose?

English only - 34
English and Tok Pisin - 50
English, Tok Pisin and Hiri Motu - 4
Tok Pisin only - 1
English and Tok Ples - 1
Tok Pisin and Tok Ples - 1

PART III: YOUR USE OF LANGUAGE IN PARTICULAR SITUATIONS

Which language would you most likely use in each of the following situations at your work place? (If you are not sure which one you would use, then say so and indicate the possible languages you might use.)

15. To explain to someone working under you how to operate a piece of equipment or machinery

English - 36
English and Tok Pisin - 47
Tok Pisin - 12
English, Tok Pisin and Hiri Motu - 3

16. To ask a technician working under you to do something related to his/her work

English - 42
English and Tok Pisin - 45
Tok Pisin - 6
English, Tok Pisin and Hiri Motu - 5

17. To discuss technical matters with fellow workers who hold a position at a level similar to yours

English - 75
English and Tok Pisin - 22
Tok Pisin - 1

18. To ask someone else to instruct you about how to perform a

technical operation

English -	*73*
English and Tok Pisin -	*19*
Tok Pisin -	*1*
English, Tok Pisin and Hiri Motu -	*1*
Not answered -	*4*

19. To discuss a technical matter with your supervisor or head of department

English -	*89*
English and Tok Pisin -	*7*
Tok Pisin -	*1*
Not answered -	*1*

20. To talk with fellow workers when you are in the field or on a project site, away from the office

English -	*23*
English and Tok Pisin -	*53*
Tok Pisin -	*13*
English, Tok Pisin and Hiri Motu -	*8*
Not answered -	*1*

21. To communicate about the daily administration of your department with:

(A) Workers under you

English -	*27*
English and Tok Pisin -	*57*
Tok Pisin -	*6*
English, Tok Pisin and Hiri Motu -	*4*
English and Tok Ples (unspecified) -	*1*
Not answered -	*3*

(B) Workers at your own level

English -	*67*
English and Tok Pisin -	*29*
English, Tok Pisin and Hiri Motu -	*1*
Not answered -	*1*

(C) Workers at a position above your own

English -	*90*
English and Tok Pisin -	*6*
Tok Pisin -	*1*
Not answered -	*1*

22. To discuss a technical matter with a customer or client of

your company who has the following level of education:

(A) Little formal education

English -	*1*
Tok Pisin -	*69*
English and Tok Pisin -	*15*
Tok Pisin and Hiri Motu-	*9*
Tok Ples, English and Hiri Motu -	*2*
Tok Pisin and Tok Ples (unspecified) -	*1*
Not answered -	*1*

(B) Primary School education

English -	*4*
English and Tok Pisin -	*41*
Tok Pisin -	*42*
Tok Pisin and Hiri Motu -	*3*
English, Tok Pisin and Hiri Motu -	*7*
Not answered -	*1*

(C) Grade 10

English -	*35*
English and Tok Pisin -	*52*
Tok Pisin -	*4*
English, Tok Pisin and Hiri Motu -	*7*

(D) Grade 12

English -	*58*
English and Tok Pisin -	*30*
English, Tok Pisin and Hiri Motu -	*5*
Tok Pisin -	*4*
Not answered -	*1*

(E) University student or graduate

English -	*70*
English and Tok Pisin -	*23*
Tok Pisin, English and Hiri Motu -	*4*
Not answered -	*1*

PART IV: YOUR OPINIONS ABOUT LANGUAGE

23. Do you think that Papua New Guinean languages other than English (such as Tok Pisin and Tok Ples) can be used to express technical and scientific ideas?

Yes -	*55*
No -	*37*
Not answered -	*6*

24. (A) Do you sometimes mix languages together (for instance, Tok Pisin and English) in the same conversation at your work place?

Yes - 86
No - 12

(B) Do other people you talk with at work do this?

Yes - 94
No - 2
Not answered - 2

(C) How often do you think such mixing of languages occurs in PNG? Underline one of the following words: never, rarely, occasionally, frequently

never - 0
rarely - 4
occasionally - 46
frequently - 46
no answer - 2

(D) What is your opinion of this practice of mixing languages?

Positive - 72
Negative - 10
Uncertain - 14
No answer - 2

25. (A) Have you ever read anything written about your technical field in a language other than English? (This includes unpublished and published texts such as books, articles, pamphlets, lists of terms, etc.)

Yes - 21
No - 76
No answer - 1

(B) If so, in what language were they written?

Tok Pisin - 11
German - 5
Hiri Motu - 3
French - 3
Japanese - 3
Dutch - 1
Spanish - 1

(C) If you can remember titles, please give them.

Among the titles mentioned were early botanical works on PNG in German; brewing journals and instructions in German; manufacturers' labels and instructions in German; business books in Tok Pisin; "How Kar Bilong You I Wok" and "Lukautim Kar" (motor vehicle books in Tok Pisin); pamphlets on carpentry and open stove construction in Tok Pisin; Lahir and Misima environmental plans in Tok Pisin and Hiri Motu; "Toksave Long Nesenel Fores Polisi" (Ministry of Forests publication); safety manuals in Tok Pisin.

26. If your answer to question 25 (A) is "YES", then did this reading help you to understand the subject matter?

Yes - 10
No - 11

27. When you were a University student, did you ever use Tok Pisin, Tok Ples or any other Papua New Guinea language to study your academic subject and/or to discuss it with fellow students or lecturers?

Yes - 57
No - 39
No answer - 2

28. If your answer to question 27 is "YES", then did using this language help you to understand the subject?

Yes - 53
No - 4

29. Do you think that your study of Language at University helped prepare you for the job you do now?

Yes - 82
No - 10
Uncertain - 6
Not answered - 1

30. If your answer to question 29 is "NO", then what kind of language training do you think would have better prepared you for the work you do now?

The following suggestions were made:
More languages besides English should have been studied. (Tok Pisin, Hiri Motu, French, Dutch, German and Japanese were mentioned.)
Tok Pisin speakers should learn Hiri Motu, and Hiri Motu

speakers should learn Tok Pisin.
More technical English and especially technical report writ ing.
More public speaking.
More on business communication.

31. What differences and/or similarities do you find between the kinds of language skills needed to follow academic work at University and the kinds of language skills you use now in your work place?

Similarities:

Report writing - 23
Technical English - 9
Public speaking - 7
Letter writing - 7
Memo writing - 6
Instructions - 3
Legal documents - 2
Computer language - 1
Taking minutes - 1
Chairing meetings - 1

Differences:

More Tok Pisin is used in the workplace - 18
A mixture of languages (especially English and Tok Pisin) is used in the work place - 9
There is a need to simplify English to explain technical concepts in the work place - 8
There is a need to translate between languages in the work place. (English and Tok Pisin were most commonly mentioned.) - 6
Spoken English is used more often than written English in the work place - 7
English is used for specific purposes in the work place: e.g., giving disciplinary advice to subordinates, termination interviews) - 2

32. Please make any other observations you would like to about your use of language in the work place.

The type of language most commonly used in the work place (between national employees and between employees and custom ers) is a mixture of languages (English and Tok Pisin most often, but some respondents mentioned English/Hiri Motu and English/Tok Ples). - 43

There is a need to use English up to an appropriate technical standard in the work place. - 25

The main problem in the work place is to put technical ideas into simple language, in both English and Tok Pisin. - 6

There is a need to develop flexibility in the use and choice of languages in the work place. - 4

Tok Pisin is inadequate for the expression of technological concepts. - 3

English is the appropriate official language for PNG. - 1

Discussion of the Responses

Part I (Background Information about Respondents):

An exhaustive coverage of graduates was not possible for reasons already noted, and responses were received from only just over one-third of those contacted (98 out of 287). Swan's (1986: 4) data are comparable in quantity. They consisted of responses from 92 employees and 76 employers, including both answers to a questionnaire and an interview in each case. No interviews were conducted in the present study, mainly because of the lack of time and resources, although in a few cases (which will be noted) the additional information interviews might have provided would have clarified the data. Swan notes that a sample of around 100 is sufficient to ensure the significance of the results. Thus, the data seem fairly comprehensive in terms of the number of respondents.

The replies to question 1 indicate a spread of respondents across PNG. Port Moresby is reported to have a population of 193,242 and Lae 78,265 (National Statistical Office, 1991: 5), by far the two most populous urban areas. Approximately two-thirds of the respondents are in these two cities, and twice the number are in Port Moresby as are in Lae. There are more from the Highlands provinces than from the coastal and island areas, which reflects national demography. But this distribution could also be due to the fact that more graduates are employed in the former than in the latter parts of the nation. The majority of employers are government departments, but some private companies (Porgera, Ramu, Ok Tedi, Shell, etc.) are represented too. Responses to questions 2 and 3 indicate that almost all respondents hold positions of authority. Many are responsible for supervising, managing and/or training other members of staff. Most are formally employed in technical or engineering positions, but it is clear that the majority of these also have managerial and administrative duties.

Replies to question 4 show that graduates who responded to the questionnaire left university during a period of 19 years, between 1972 and 1991. Swan's respondents were limited to 1978 and 1979 graduates because one of his aims was to assess the

effectiveness of language instruction at Unitech during those years. Since the main purpose of the present study is to find out how graduates in the work place use language now, it was considered desirable to collect information from individuals who attended the University over a longer period. A balance between older and more recent graduates reflects the varied language use of both more and less experienced employees. Since the annual number of graduates has risen over the 25 years the University has been in operation, the majority of respondents are comparatively recent graduates.

Part II (Use of Language in General):

With regard to question 5, it is hardly surprising that all the respondents speak English. Not surprising either is the fact that almost all of them speak Tok Pisin too. Relatively few speak Hiri Motu, which supports the general view that Tok Pisin is becoming the main national *lingua franca*. Only 65 of the 98 respondents to question 5 mentioned a Tok Ples language, which could indicate that the 33 others have Tok Pisin, Hiri Motu or English as a first language. This possibility could have been confirmed (or not) if there had been a question specifically asking respondents to give their first languages. The responses to question 6 show that English and Tok Pisin are by far the most common languages in the work place. Although English here has a higher number of "Often" responses than Tok Pisin does, the combined frequencies of "Often" and "Sometimes" for these two languages are almost equal (97 for English and 92 for Tok Pisin). The evidence here suggests that now almost all Unitech graduates use Tok Pisin to some extent in their jobs, compared to the seventy-five per cent reported by Swan and Lewis in 1990.

Many of the responses to question 7 evince an interesting attitude towards the nature of language, one which occurs in subsequent answers as well. Although the question uses the singular term *language*, as many as 27 respondents answered by naming two or more languages when asked which one they use most often. This suggests that some Papua New Guineans may not distinguish between one language and another in the same way linguists do and that the category "English and Tok Pisin" may be perceived as a single linguistic entity. The answers to question 7 confirm that English is used more often than any other language, but either Tok Pisin on its own or a mixture of languages is used more than half as often (36 compared to 60) as English. Answers to question 9 show that most respondents are comfortable with the languages they know, which reinforces the impression that a combination of English and Tok Pisin achieves communicative ends that neither language on its own would do. The responses to question 10 show that in those few cases where other languages could help communication, these are considered to be mainly Tok Pisin and Hiri Motu. Since most respondents already speak these languages, they may mean here that a higher degree of fluency would help.

Responses to the three parts of question 11 indicate that although English is (as was expected) by far the most frequently used language for writing, in those cases when another language is written, it is likely to be Tok Pisin. The types of discourse mentioned under 11(C) cover a a wide range. (However, there is evidence in the wording of individual answers that some respondents were thinking of writing in *English* here.) Answers to question 12 support those to question 9: most respondents (about three-quarters) feel they communicate adequately in the work place. Responses to question 13 reveal that a lack of fluency in a language is considered to be responsible for communication problems in one-quarter of cases, and the particular problems concern both a lack of indigenous PNG languages (especially the Tok Ples of fellow workers) as well as inadequacies in more specialized technical English. Responses to question 14 confirm information from Part I: almost all respondents (91) are responsible for training other staff. The tendency noted above for conceptualizing English and Tok Pisin together as "a language" is especially apparent in 14 where half the respondents (50) claim they use this combination as the medium for training, compared to about one-third (34) who use English only.

Part III (Use of Language in Particular Situations):

This section of the questionnaire asks respondents to say what language they would use in a number of designated circumstances. Again, a significant proportion think of "English and Tok Pisin" (and to a less extent other combinations such as "English, Tok Pisin and Hiri Motu") as a single entity. This suggests that they do not consciously separate the languages they mix together in a specific situation. The reason may be related to the frequency of code mixing (to be considered in Part IV) in the work place. It has been argued (Moody, 1992a) that the mixing of languages, in the sense of rapid and repeated switching from one to another (within and between words, sentences and turns in a conversation), functions as a superordinate code in the unstable diglossia of urban Papua New Guinea. The selection of this "mixed code" carries a similar kind of pragmatic meaning as the choice of one distinct language over another would in a system of stable diglossia.

Responses to questions 15 and 16 indicate that English is used to communicate with subordinates about technical matters and that Tok Pisin alone is much less frequent. But in well over half these cases such communication occurs in a combination of languages (most commonly Tok Pisin and English), as can be seen if all the options mentioned except English are added together. On the other hand, when communication occurs between graduates and co-workers at the same or a higher level (in questions 17, 18 and 19), then English alone is used far more often. The high frequency of English as the choice in question 19 (discussion with a supervisor) may be related to the fact that the supervisors of most graduates are likely to be expatriates who know little or no Tok Pisin. (This point was explicitly made by a

number of respondents.) When the supervisor is Papua New Guinean, then it could well be that the preferred choice is a mixture of languages. One of the seven respondents who use a combination of English and Tok Pisin with a supervisor added the information that it was "because my supervisor is a national".

The higher frequency of "English and Tok Pisin" in the responses to question 17 (about communication between equals) suggests that the same combination would be favoured in question 19 if more supervisors were able to communicate in Tok Pisin. The fact that languages other than English are mentioned in responses to questions 17 and 19 indicate that these languages are not chosen solely because an interlocutor's English is inadequate, since colleagues at the levels indicated would know English at least as well as the respondents. The replies to question 20 show that outside the office, in the field, Tok Pisin alone is used as well as the English/Tok Pisin combination. In fact the two latter choices taken together in question 20 are almost three times more frequent than English alone (66 vs. 23). As Swan points out (1986: 15), graduates in the field often work with employees who either do not speak English at all or else prefer to use Tok Pisin.

Question 21 relates to fellow workers (as do the previous questions in this section) but concerns communication about administrative activities rather than technical matters. A shortcoming of this question is that it does not specify whether oral or written communication is meant, although the former was intended. The replies to 21(A), (B) and (C) follow a similar pattern as those to 15 - 19: the frequency of the choice of English is directly proportional to the authority held by the interlocutor. English is not sufficient for all on-the-job communication with subordinates, so a combination of English and Tok Pisin is most often chosen (21[A]). In 21(B) almost half as many respondents use this combination as use English exclusively (29 compared to 67) with workers at the same level. Only when communication is with a superior is English the overwhelming choice for administration, which is similar to the responses to question 19 about technical communication between the same groups.

Question 22 shifts the focus to communication with customers. Here the pattern is somewhat different. In 22(A), which asks about customers who have little formal education, for the first time a majority of respondents (69) select Tok Pisin only, and only one claims an exclusive use of English. As we go up the educational ladder, English becomes more and more prominent, and when communication is conducted with a Grade 12 leaver (22[D]) or above (22[E]) English alone is used more often than a combination of English and Tok Pisin. However, with highly educated customers, Tok Pisin continues to be combined with English to a significant extent: half as much as English alone with Grade 12 leavers and one-third as much as English alone with university students/graduates. A comparison of the replies to 22(D) and 22(E) with those to 17, 18 and 19 reveals that respondents are more likely to use some Tok Pisin when talking with customers who

have similar or higher education, than they are when talking with fellow workers who hold similar or higher positions.

Part IV (Attitudes to Languages and Language Use):

Two aspects of the PNG multilingual ecology have sometimes been stigmatized, both within the nation and from outside. First, the supposed inadequacy of Tok Ples, Tok Pisin and other *lingue franche* to meet the needs of communication in modern industrial societies, especially in the fields of science and technology, has been a concern at both theoretical (linguistic) and practical levels. (See, e.g., the comments of Piau, 1984: 489.) Second, code mixing has sometimes been attributed to a "similingual" deficit and considered as a mark of incompetence rather than treated as a positive communicative resource. (See Moody, 1992b for a critique of both these opinions of PNG multilingualism.) Questions 23 and 24 were included to ascertain the views of respondents about the adequacy of indigenous languages and code mixing for communication in PNG.

More than half (55) the respondents to question 23 support the idea that Tok Pisin/Tok Ples can express technical and scientific ideas. Sure (1991: 245) has observed that there is likely to be a correlation between the practical functions a *lingua franca* serves and a positive assessment of its value. The fact that respondents *need* to use Tok Pisin for technical communication no doubt accounts for the positive responses to question 23. Nevertheless, this attitude is by no means unanimous: more than one-third (37) give negative answers to question 23. Replies to the various parts of question 24 show that code-mixing is alive and well in the Papua New Guinean work place. Almost all respondents (86) admit to engaging in this practice in 24(A), and even more (94) claim that fellow workers do it in 24(B). Furthermore in 24(C) all but four respondents report that it occurs either "occasionally" or "frequently", with opinion being equally divided (46-46) between these two estimates. In 24(D) three-quarters (72) of the respondents have a definitely positive attitude towards code-mixing. Many of the answers to 24(D) stress the practical purposes served by mixing languages in Papua New Guinea. They point out that in order to ensure successful communication it is often necessary to speak in this way. Some of the 14 respondents to 24(D) who are uncertain about code mixing pointed out that although they consider it to be a "bad" practice, they nevertheless find it essential for themselves and others. Sociolinguistic necessity, then, would appear to override personal preference in these cases.

Questions 25 and 26 were intended to establish whether respondents had read about technical subjects in languages other than English and, if so, whether they considered this reading to be beneficial. Responses to 25(A) show that most (76) have never engaged in such reading, probably because technical education in PNG is in English. Questions 25(B) and (C) deal with the extent to which other languages are used for written technical communi-

cation in PNG. Fourteen respondents mention Tok Pisin or Hiri Motu, and 13 report that they have read materials in foreign languages. Replies to 25(C) show that handbooks, manuals and reports are read in Tok Pisin and Hiri Motu. The responses to question 26, however, cast doubt on whether texts written in these languages disseminate technical information to any significant degree, since the number of respondents who think that such reading helped them is almost equal to those who think it did not. Responses to questions 25 and 26, considered together with those to question 11, suggest that for professional technologists in the work place, PNG languages other than English are more important for oral than for written communication.

Questions 27 and 28 ask about respondents' language use at university. The answers to question 27 indicate that more than half used Tok Pisin in their academic work. This confirms the previous research of Johnson (1977: 455) and Swan and Lewis (1990) referred to above. Furthermore, in replies to question 28 almost all graduates who answer yes to question 28 believe that using Tok Pisin helped them to learn. Neither question asks about the frequency or the specific purposes Tok Pisin served in university studies. But it is likely that, as Swan and Lewis note, it was used mainly in discussions about academic matters between students outside class. Questions 29, 30 and 31 all focus on attitudes towards language instruction in university. Language classes at Unitech have, since their inception, concentrated almost entirely on improving students' English skills. It would have been surprising as well as disheartening if the majority of replies to question 29 had indicated that respondents thought language study had *not* prepared them for employment. However, most of those few who give a negative reply to 29 indicate in 30 that they would like to have had training for communication in the work place in languages other than English, especially in Tok Pisin.

The responses to the first part of question 31 (concerned with similarities between graduate employees' language needs and the language study they did at university) indicate that most of the areas covered in ESP classes at Unitech are considered as relevant to later employment. Advanced ESP work concentrates largely on report writing for particular academic courses, and many respondents continue to use these skills in the work place. However, when we move to the perceived differences between language study at university and language use at work, two general needs clearly emerge. First is the need to expand the ESP focus of teaching to a more general LSP one. Most of the responses to this part of the question (33 out of a total of 50) emphasize that successful communication in the work place depends upon using languages other than English (particularly Tok Pisin). Secondly, there is a need to give more attention to "simplified" English to carry out functions ranging from explaining technical concepts to offering advice. The need for simpler language is also mentioned in six responses to question 32. It is significant that when invited to make additional comments in question 32, 43 respondents pointed out that a *mixture* of languages characterizes

communication in the work place in PNG. Thus, as four respondents specifically note, it is important to develop *flexibility* in language choice and use.

Implications and Recommendations

Tok Pisin and English are the two most important languages in Papua New Guinea today (Wurm and Muhlhausler, 1979: 247). The responses to the questionnaire show that this generalization holds for technical communication in the work place no less than for other domains. Technical communication may be accomplished in a number of ways: through Tok Pisin alone, through mixing languages, through "simplified" English, as well as through more formal "technical" English. The question that confronts LSP in Papua New Guinea is not whether people *ought* to communicate in so many different ways. It is, rather, that since they conventionally do so, how can they be helped to accomplish most effectively the communicative tasks required of them. The remainder of this paper considers briefly some implications of the research findings for language education of technologists in tertiary institutions in PNG. It is hoped that, having established what the communicative needs of graduates actually are, we can go on to develop practical and appropriate LSP syllabuses, materials and methodologies.

In the multilingual ecology of the nation, an exclusively ESP policy for communicative language teaching is likely to be limited to achieving what Widdowson (1983: 9) refers to as *training*. This approach aims to achieve competence in solving a specific range of problems identified in advance. But ESP alone is incapable of providing what Widdowson considers, in contrast, to be language *education*: the creative ability to cope potentially with all problems likely to arise in a communicative situation. Unitech graduates certainly need to know how to exploit the resources of technical English in their specialist fields. This is acknowledged in many responses to the questionnaire, notably by 25 of the replies to question 32, which refer specifically to this point.

However, the data also show that graduates need to select, switch to, and mix English with Tok Pisin, as well as to translate between them with speed and ease. It could be argued-- and sometimes is-- that to teach students a language they "already know" is unnecessary and a waste of classroom time. But "knowing" and "using" are not the same, and the principles of communicative teaching belie this argument. In an exercise given to first-year Electrical Engineering students (all competent speakers of Tok Pisin) in a language class at the University of Technology in 1992, it was clear that most of them had never considered the possibility of expressing technological ideas in Tok Pisin at all. They found it difficult to put concepts such as *conductor*, *current*, *resistor* and *magnetism* into Tok Pisin. In fact, to appreciate this difficulty was one of the objectives of the

exercise. (See Moody, 1992a.) These students just as clearly would have experienced serious problems trying to cope with communicative demands of the kind that, the data indicate, confront Unitech graduates daily in their professional lives.

The linguistic ability required for language *education* in PNG involves exploiting the *meaning potential* (Halliday, 1978) not only of separate, individual languages (English, Tok Pisin, etc.). In terms of the wider *social semiotic*, to negotiate meaning in a multilingual speech community with unstable diglossia also entails manipulating the overall meaning system generated by the language ecology. For most of the specific purposes that confront Unitech graduates at present, there will probably be no predetermined formulaic way of using language-- any language. Thus, students should acquire the necessary self confidence, flexibility and imagination to express themselves in whatever languages and/or mixtures of languages are deemed appropriate by the speech community, given the contingencies of particular communicative events. They need to know what it means to select Tok Pisin over English (and vice-versa) when it is possible to use either and what it means pragmatically to switch from one language to the other and back again during the course of a conversation. An LSP programme should aim to develop skills in all these areas.

LSP can be subdivided into LOP (Language for Occupational Purposes) and LAP (Language for Academic Purposes). As noted above, ESP programmes currently offered at Unitech include elements of both EOP and EAP. Most of the data provided by the present questionnaire is relevant to LOP. However, the responses to questions 25 - 28 have implications for LAP, since they ask about graduates' use of languages other than English in their university studies. Swan and Lewis (1990: 224) cast doubt on the desirability of Tok Pisin for academic purposes when they report their findings that tertiary students of technology who failed their first-year course used significantly more Tok Pisin than those who passed. However, responses to question 28 show that almost all graduates who used languages other than English in their studies believe that it helped them. This may well be so. The mental processes involved in simplification, translation, explanation and interpretation from one language into another require that concepts be clearly understood. Students at Unitech who did the exercise in translating electronic terms from English into Tok Pisin (Moody, 1992a) were forced to think about electronics in a new way. Such an ability to *renegotiate* meaning, to see ideas from a new perspective, aids understanding, and it should be an aim of all university education.

In a report of an investigation into Unitech students' understanding of English words, Marshall *et al.* (1990: 117) raise the question of whether students already possess scientific concepts and need to be taught the English words for them, or whether they need to be taught the concepts. Their report does not give a conclusive answer to the question, but there is some evidence to suggest that many Unitech students have the latter

need. In so far as this is the case, then it could be argued that technical and scientific terms and ideas are more likely to be understood if they are introduced in a language with which the student is already familiar than they would be if they were introduced in English. Once the initial conceptualization occurs, then words can be translated into English with a clearer understanding than would be possible if students were expected to learn the new concept and the new English word for it simultaneously. Thus, the use of Tok Pisin in the classroom could be an aid to technological education rather than a hindrance. Languages other than English, then, have a role to play not only in LOP but in LAP as well.

Finally, as well as the need to broaden an ESP approach to communicative teaching into an LSP one, the present data also suggest a need to review some assumptions about tertiary English teaching itself in Papua New Guinea. The responses to questions 31 and 32 which stress the desirability of a more "simple" type of English in the work place indicate that perhaps more attention should be given to the local variety of PNG English as has been characterized, for instance, by A.M. Smith (1986) and Yarupawa (1986). Kachru (1986) has drawn attention to the fact that both conceptual and applied research have avoided addressing issues vital for understanding the uses of English in multilingual ESL communities. He urges a "pluralistic" approach to ESP, one in which both formal structures and pragmatic principles of local varieties of English be adopted as the target. Communicative teaching should primarily develop *intra*national communication. Hence, the traditional appeal to "first-language competence" as the goal of ESP in PNG seems misplaced.

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